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Jamie Soon[a*], David Adams[a], Kishalay De[b], Antony Galla[a], Matthew Hankins[b], Mansi M. Kasliwal[b], Anna M. Moore[a], Scott M. Adams[b], Jarek Antoszewski[c], Michael Ashley[d], Aliya-Nur Babul[e], Joss Bland-Hawthorn[f], Jeff Cooke[g], Orsola De Marco[h], Alexandre Delacroix[i], Hadrien Devillepoix[j], Simon C. Ellis[h], Ken C. Freeman[a], David Hale[i], Alexander Heger[k], Jacob E. Jencson[b], Ryan M. Lau[l], Daniel McKenna[i], Eran Ofek[m], Stuart Ryder[h], Robert Simcoe[n], Jennifer L. Sokoloski[e], Roberto Soria[o], Roger M. Smith[i], and Tony D. Travouillon[a]

[a]Research School of Astronomy and Astrophysics, Australian National University, Canberra, ACT 2611, Australia
[b]Division of Physics, Math, and Astronomy, California Institute of Technology, 1200 E California Blvd, Mail Code 249-17, Pasadena, CA 91125, USA
[c]School of Electrical, Electronic and Computer Engineering, The University of Western Australia, Perth, WA, Australia
[d]School of Physics, University of New South Wales, Sydney, NSW 2052, Australia
[e]Columbia Astrophysics Laboratory, Columbia University, New York, NY 10027, USA
[f]Sydney Institute of Astronomy, School of Physics, University of Sydney, Sydney, NSW 2006, Australia
[g]Department of Physics and Astronomy, Swinburne University of Technology, Hawthorn, VIC 3122, Australia
[h]Department of Physics and Astronomy, Macquarie University, Sydney, NSW 2109, Australia
[i]Caltech Optical Observatories, California Institute of Technology, 1200 E California Blvd., Mail Code 11-17, Pasadena, CA 91125, USA
[j]School of Earth and Planetary Sciences, Curtin University, GPO Box U1987, Perth WA 6845, Australia
[k]School of Physics and Astronomy, Monash University, Victoria 3800, Australia
[l]Institute of Space & Astronautical Science, Japan Aerospace Exploration Agency, 3-1-1 Yoshinodai, Chuo-ku, Sagamihara, Kanagawa 252-5210, Japan
[m]Weizmann Institute of Science, Rehovot 76100, Israel
[n]MIT Kavli Institute for Astrophysics & Space Research, Cambridge, MA 02139, USA
[o]National Astronomical Observatories, Chinese Academy of Sciences, Beijing 100012, China

ABSTRACT

There have been a dramatic increase in the number of optical and radio transient surveys due to astronomical transients such as gravitational waves and gamma ray bursts, however, there have been a limited number of wide-field infrared surveys due to narrow field-of-view and high cost of infrared cameras, we present two new wide-field near-infrared fully automated surveyors; Palomar Gattini-IR and the Dynamic REd All-sky Monitoring Survey (DREAMS). Palomar Gattini-IR, a 25 square degree J-band imager that begun science operations at Palomar Observatory, USA in October 2018; we report on survey strategy as well as telescope and observatory operations and will also providing initial science results. DREAMS is a 3.75 square degree wide-field imager that is planned for Siding Spring Observatory, Australia; we report on the current optical and mechanical design and plans to

Corresponding Author - Jamie Soon: jamie.soon@anu.edu.au

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achieve on-sky results in 2020. DREAMS is on-track to be one of the first astronomical telescopes to use an Indium Galium Arsenide (InGaAs) detector and we report initial on-sky testing results for the selected detector package. DREAMS is also well placed to take advantage and provide near-infrared follow-up of the LSST.

Keywords: Gattini-IR, DREAMS, transients, all-sky survey, near-infrared, wide-field, Siding Spring Observatory, Palomar Observatory

1. INTRODUCTION

There are a large number of optical and radio all-sky monitoring surveys which detect and monitor astronomical events, and aim for localisation of gravitational wave events. However, all-sky surveys in the infrared have been limited by a number of factors including the bright sky background and the narrow field-of-view of infrared cameras. The proliferation of small aperture wide-field optical telescopes has not been repeated in the infrared due to these factors and others including cost, atmospheric transmission, and operating requirements.

We present a series of currently operating and proposed near-infrared all-sky monitoring telescopes; these are Palomar Gattini-IR,[1] currently operating at Palomar Observatory, USA; and the Dynamic REd All-sky Monitoring Survey (DREAMS),[2] planned for Siding Spring Observatory, Australia; the specifications for each telescope are summarised in Table 1.

Table 1: Telescope Specifications

	Palomar Gattini-IR	**DREAMS**
Telescope Aperture (mm)	300	500
Final F/ratio	1.44	2.0
Field of view (sq. degrees)	25	3.75
Filter	J	(Y), J, H
Detector type	Teledyne Hawaii 2RG	6x Princeton SCICAM InGaAs
Pixels per array	2048x2048	1280x1024
Pixel Size (µm)	18	12
Plate scale (arcsec)	8.59	2.48
Survey depth (M_{AB})	15.7	17.8

Palomar Gattini-IR has begun science observations and will survey the entire observable sky to a depth of 16.4 M_{AB}, the survey is currently planned to run for two years. Palomar Gattini-IR is observing dynamic near-infrared transients and providing follow-up and localisation of astronomical transient detections. The Dynamic REd All-sky Monitoring Survey will be provide a near-infrared wide-field astronomical capability using InGaAs detectors and is well placed to capitalise on Australia's location to provide a new infrared telescope in the southern hemisphere.

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